Stop over-salting to keep fresh water fresh

Humans have used salt for centuries as a seasoning, a preservative, and even as currency. But one of its primary uses may surprise you. The #1 use for salt in the United States is road de-icing. According to the United States Geological Survey's 2020 Mineral Commodities Report, 43% of salt used in the US in 2019 was put on our roads to melt snow and ice during the winter. This adds up to a big problem, because the 42 million tons of salt we put on our roads doesn't stay there.

Every bit of salt put down on the road eventually ends up dissolved in melting snow or rain and runs into our lakes, rivers, and groundwater, which puts freshwater ecosystems at risk. Once salt gets in the water, treatment options are limited and costly. Additionally, the salt itself carries a big price tag. Wisconsin alone spends around $40 million on road salt each year.

So why do we even use salt? Well, it is an effective way to keep our roads and sidewalks ice free – at least above 15°F.

Above 15°F, salt mixes with snow and ice and raises its freezing point, keeping things liquid. Below this temperature it cannot do its job and ends up accumulating in clumps. When it gets cold, it is best to switch to a different de-icer or use sand for traction.

The biggest problem with salt-use is over-application. Using salt when it will not work or simply putting too much down does not increase safety, instead, it puts our freshwater resources at risk. And in most circumstances, not that much salt is needed. Over-application can be avoided by lightly scattering salt and leaving 3" of space between the crystals.

This is an example of an over-salted sidewalk with poor scattering. This sidewalk is no safer to walk on than one that is appropriately salted, and this over-application puts freshwater at risk.

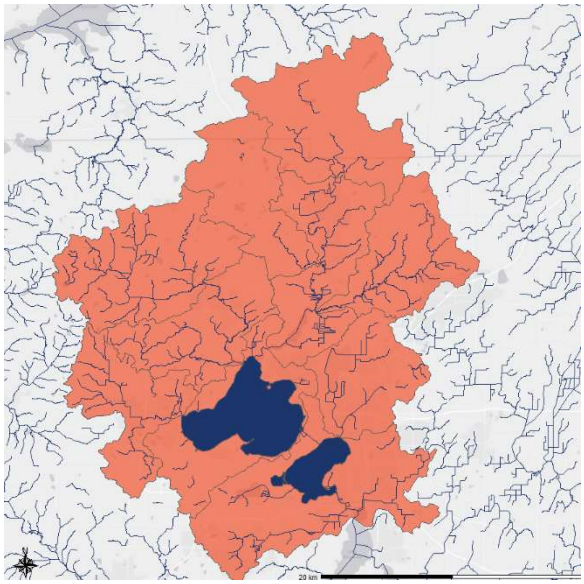
Graduate student Linnea Rock taking water samples at Starkweather Creek. When monitoring chloride in surface water, field work through the winter is essential.

One way that we monitor salt in the environment is by looking specifically at chloride, part of the commonly-used rock salt, sodium chloride (or NaCl). Chloride is easy to track because when salt dissolves, chloride tends to stick around for a long time.

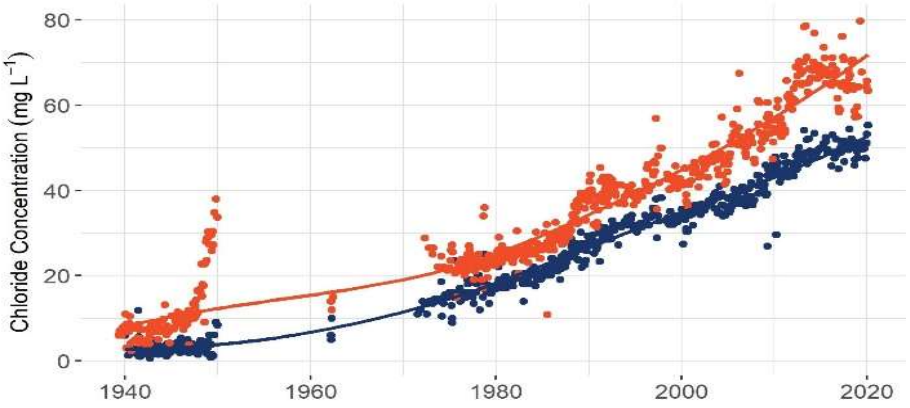
In Wisconsin, more and more waters are showing increasing amounts of chloride. Urban areas with a lot of pavement are hit the hardest, but chloride levels are increasing nearly everywhere. Road salt is the main source, but there are other sources, like agricultural runoff and water softener salt.

The Upper Yahara River Watershed in Dane County contains lakes Mendota and Monona as well as many miles of streams and acres of wetlands. It also contains the state's capital city and flagship university, making it a hotspot for urban growth. Urban growth means more pavement, buildings, and homes and therefore, more salt. The intersection of abundant freshwater and urban growth makes this watershed a good candidate for chloride monitoring.

Chloride levels are elevated everywhere in this watershed. Significant chloride inputs into surface water come from areas with large parking lots, where over-application of salt tends to occur. Year-round surface water monitoring at different points in the watershed will improve our understanding of the status and future of chloride in our lakes and rivers.



The Upper Yahara River Watershed is colored in orange with the lakes and streams in blue. When we put salt on the landscape within this watershed, it flushes into the streams and lakes.



Chloride concentrations in Lake Mendota (blue points) and Lake Monona (orange points) has been increasing since the 1940s and shows no sign of slowing down with our current salting practices.

The abundance of lakes and rivers is what makes Wisconsin communities unique. With our pride in our freshwater resources comes a responsibility to care for them. Salt pollution is a threat that we can prevent by adopting better salt-use practices. Wisconsin Salt Wise provides information on how you can do better as an individual, homeowner, or winter maintenance professional, to stop over-applying salt and help keep our fresh waters fresh.

Written by Linnea Rock, a graduate student at the University of Wisconsin Center for Limnology. In her free time, you'll most likely find Linnea canoeing, skiing, or baking something sweet. Luckily, winter is her favorite season, so she doesn't mind bundling up for winter field work. At the end of a long field day, she loves to cozy up with hot cocoa and a mystery novel.